

## Patent claims

1. A method for channel coding in a GSM mobile radio system, in which a channel coding which uses recursive system codes with a numerator polynomial and a denominator polynomial is performed at the transmitting end for the transmission via a radio interface between a base station (BS) and a subscriber station (MS).
2. The method as claimed in claim 1, in which a nonrecursive channel decoding is performed at the receiving end.
3. The method as claimed in claim 2, in which, after channel decoding with the numerator polynomial, post-processing is performed on the basis of the denominator polynomial.
4. The method as claimed in claim 3, in which the post-processing is performed by programming means.
5. The method as claimed in one of the previous claims, in which a priori knowledge is obtained from previous decoding at the receiving end and this a priori knowledge is used in subsequent channel decoding.
6. The method as claimed in one of the previous claims, in which the channel decoding is completely switched off in a subscriber station (MS) and thereafter the transmitted systematic data bits which are not channel coded are used.
7. The method as claimed in one of the previous claims, in which a transmission quality is determined during a channel estimation, and

the channel decoding is switched on or off in dependence on the transmission quality.

8. The method as claimed in one of the previous claims, in which the recursive systematic codes are used in an adaptive multirate coder, a coder being selected in accordance with the transmission conditions.

9. The method as claimed in one of the previous claims, in which, of the two polynomials of the recursive systematic codes, at least one polynomial of a nonrecursive systematic code previously used in the GSM mobile radio system is used.

10. The base station (BS) for a GSM mobile radio system which performs, for the transmission via a radio interface to a subscriber station (MS), a channel coding which uses recursive systematic codes comprising a numerator polynomial and a denominator polynomial.

11. A subscriber station (MS) for a GSM mobile radio system which performs, for the transmission via a radio interface to a base station (BS), a channel coding which uses recursive systematic codes comprising a numerator polynomial and a denominator polynomial.

12. The subscriber station (MS) as claimed in claim 11, comprising a channel decoder which can be switched off.

13. The subscriber station (MS) as claimed in claim 12, comprising a channel decoder which, in the switched-off state, forwards the transmitted data which are not channel coded.

**Key to figures**

Figure 1:

Stand der Technik = Prior art

Figure 2:

Nonsystematic nonrecursive code with memory 4 and rate 1/2 analogously to GSM/TCHFS

Figure 3:

Identical recursive systematic convolutional code with memory 4 and rate 1/2

Figure 4:

- 1 In-band data
- 2 Voice frames
- 3 Sorting
- 4 Class 2
- 5 Block code
- 6 Convolutional code
- 7 or
- 8 Reordering and distribution
- 9 Diagonal interleaving  
in: 4 blocks  
out: block pairs
- 10 Encryption

Figure 5:

Polynomials used in different channels in the GSM mobile radio system

- 1 User data channel, adaptive multirate coding, full rate
- 2 User data channel, adaptive multirate coding, half rate

Figure 6:

- 1 Receiver
- 2 Channel decoder
- 3 Post-processing